

Climate, Climate Variability and Climate Change

Central Alaska National Parks Climate
Change Scenario Workshop
April 16, 2012

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Fairbanks, Alaska



Today

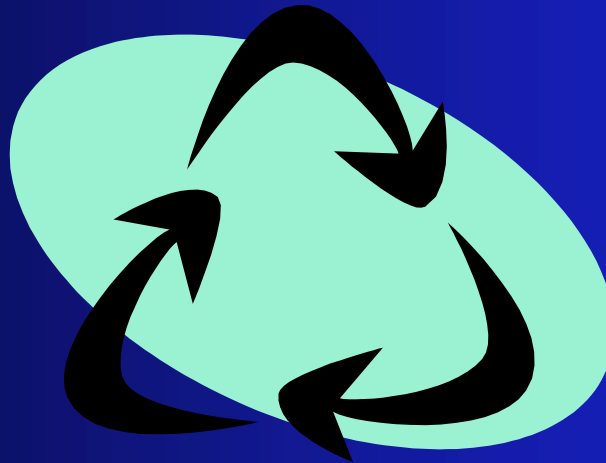
- Weather vs. climate
- Central Alaska NPS units and climate
- Climate variability
- Climate change



FAA supplementary weather product

Climate or Weather?

“Climate is what you expect...
weather is what you get”

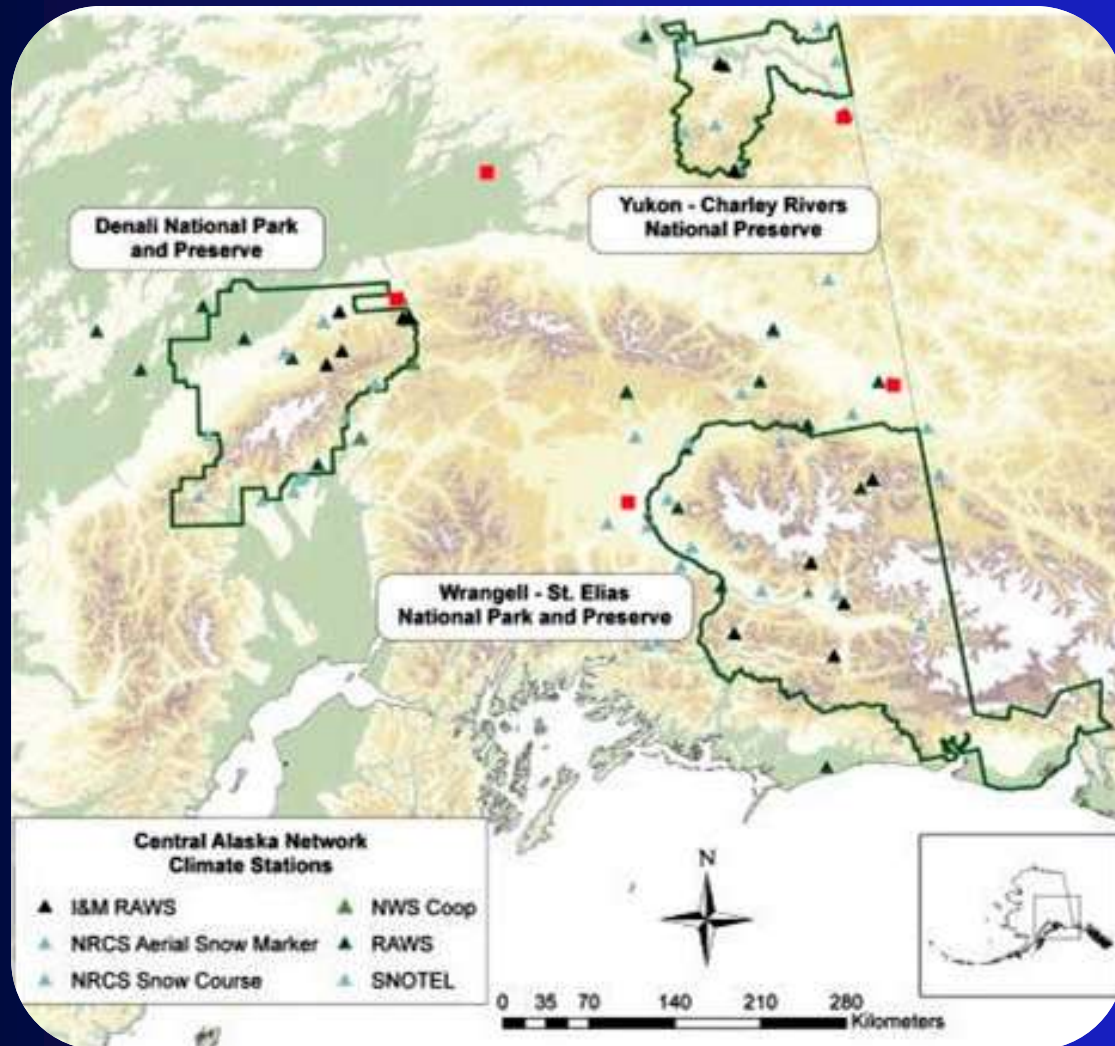


Climate is a baseball player's batting average...
Weather is what happens each at-bat

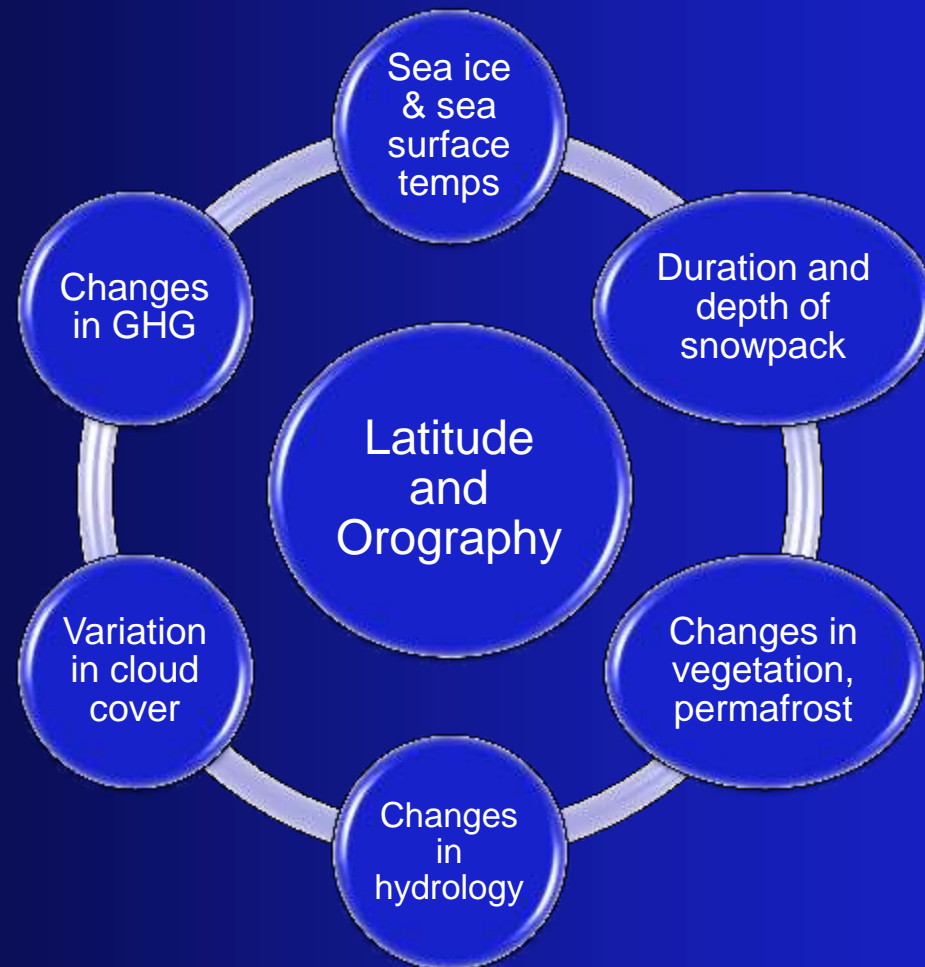
Weather vs. Climate

- Weather: short term state of the atmosphere
 - Instantaneous to few days
- Seasons: weeks to months
- Climate: “statistics of weather”
 - Long term (decadal scale) averages, frequency of specific events and extremes—generally 3 to 5 decades needed

Climate Scale Instrumental Data is Sparse

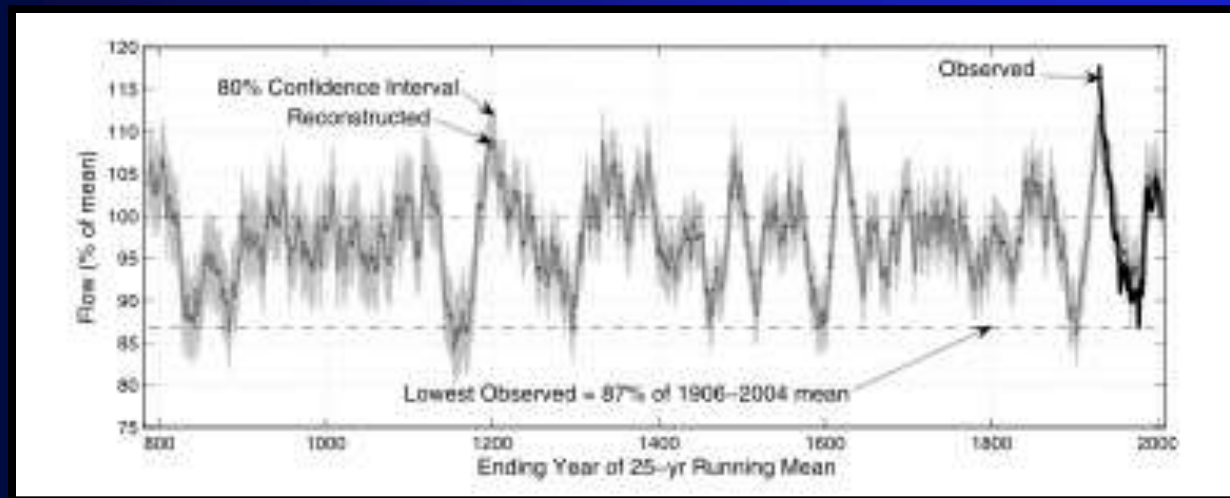


Physical Drivers of Central Alaska Climate



Climate Variability vs. Change

- Difference between climate variability & change depends on scale of interest
 - Variability—years to decades
 - Change—decadal to millennial scale
“baseline”

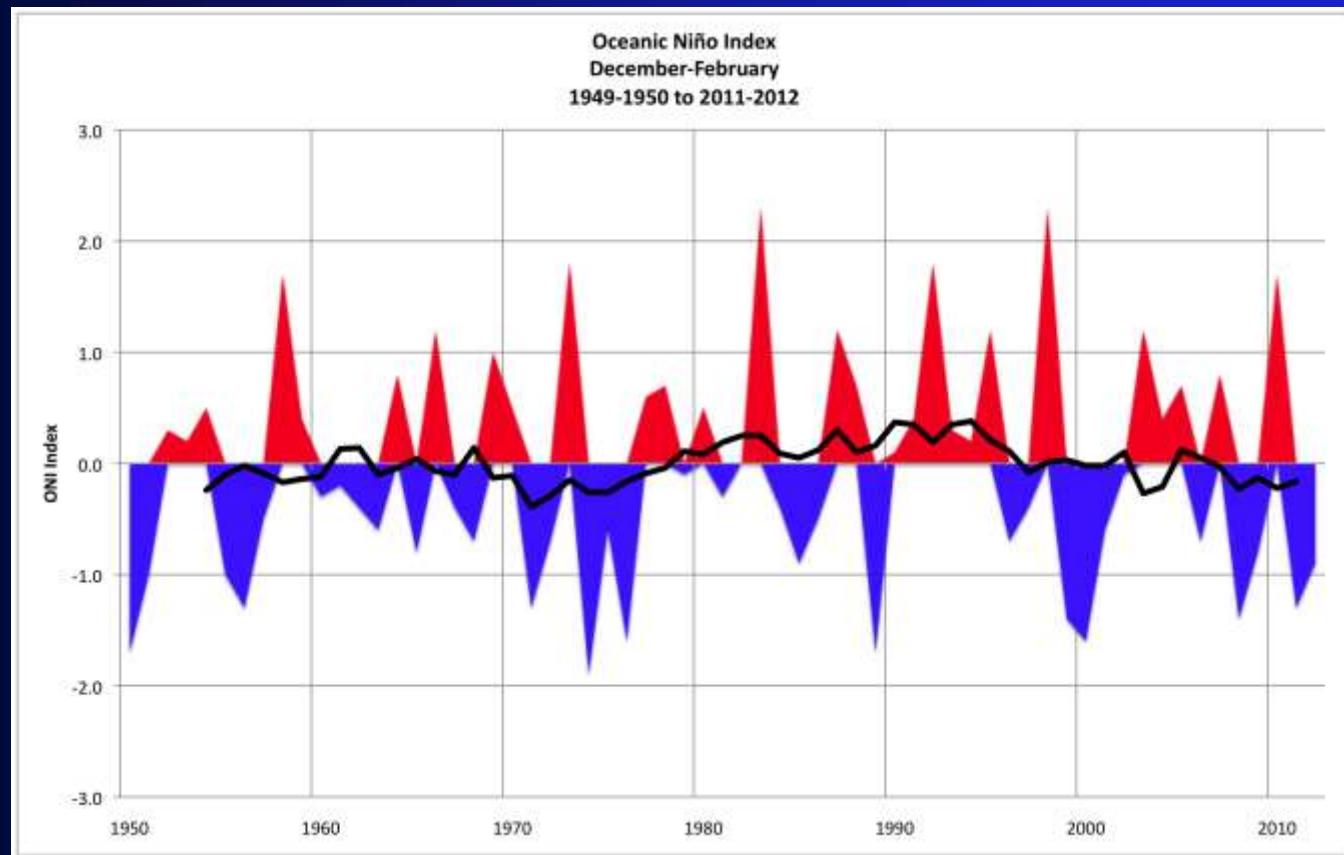


Meko et. al.
2007

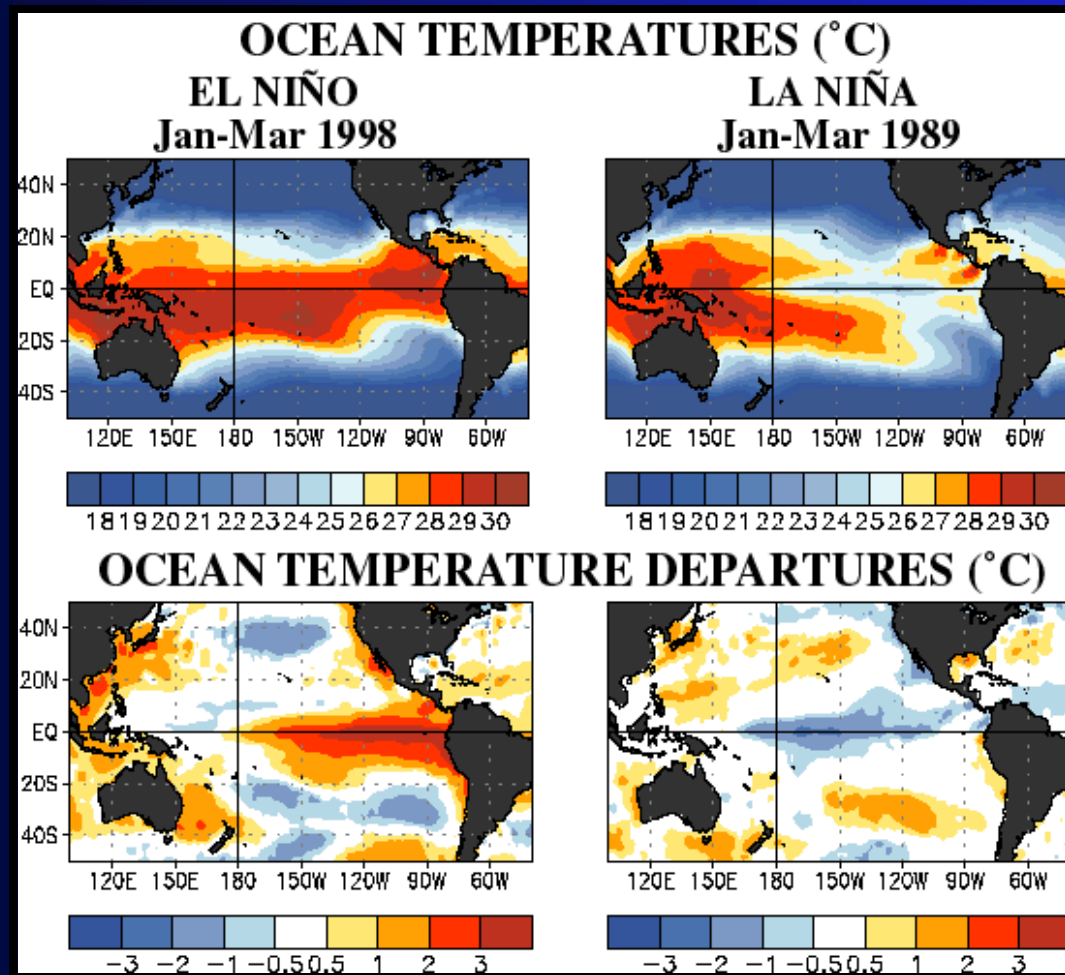
Influences on Climate Variability in Alaska

- El-Niño Southern Oscillation
 - 2 to 5 year semi-cyclical variation in equatorial Pacific sea surface temperatures
 - Limited correlation with Interior winter temperature
- Pacific Decadal Oscillation
 - Multi-decade variation in non-equatorial Pacific sea surface temperatures
 - Strong correlation with Interior Alaska climate

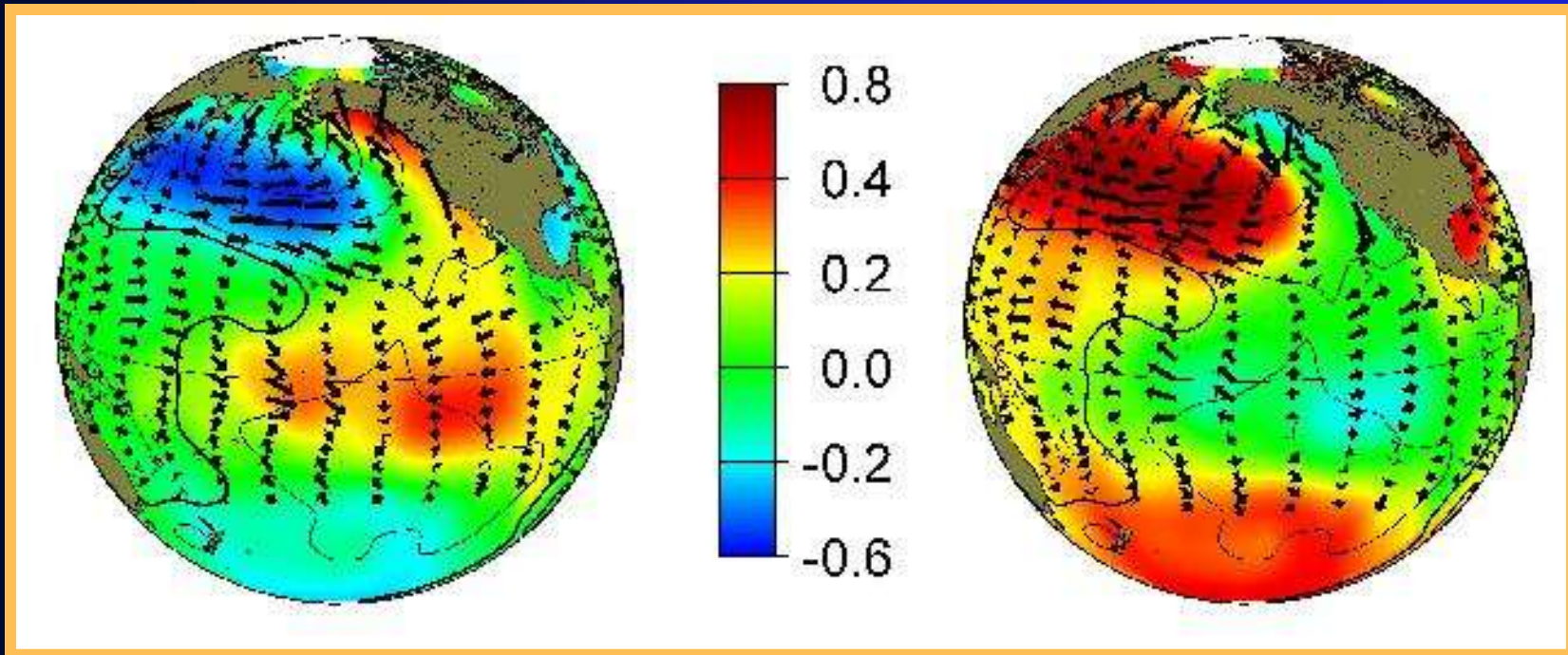
ENSO: El Niño + La Niña



Typical ENSO Sea Surface Temperatures



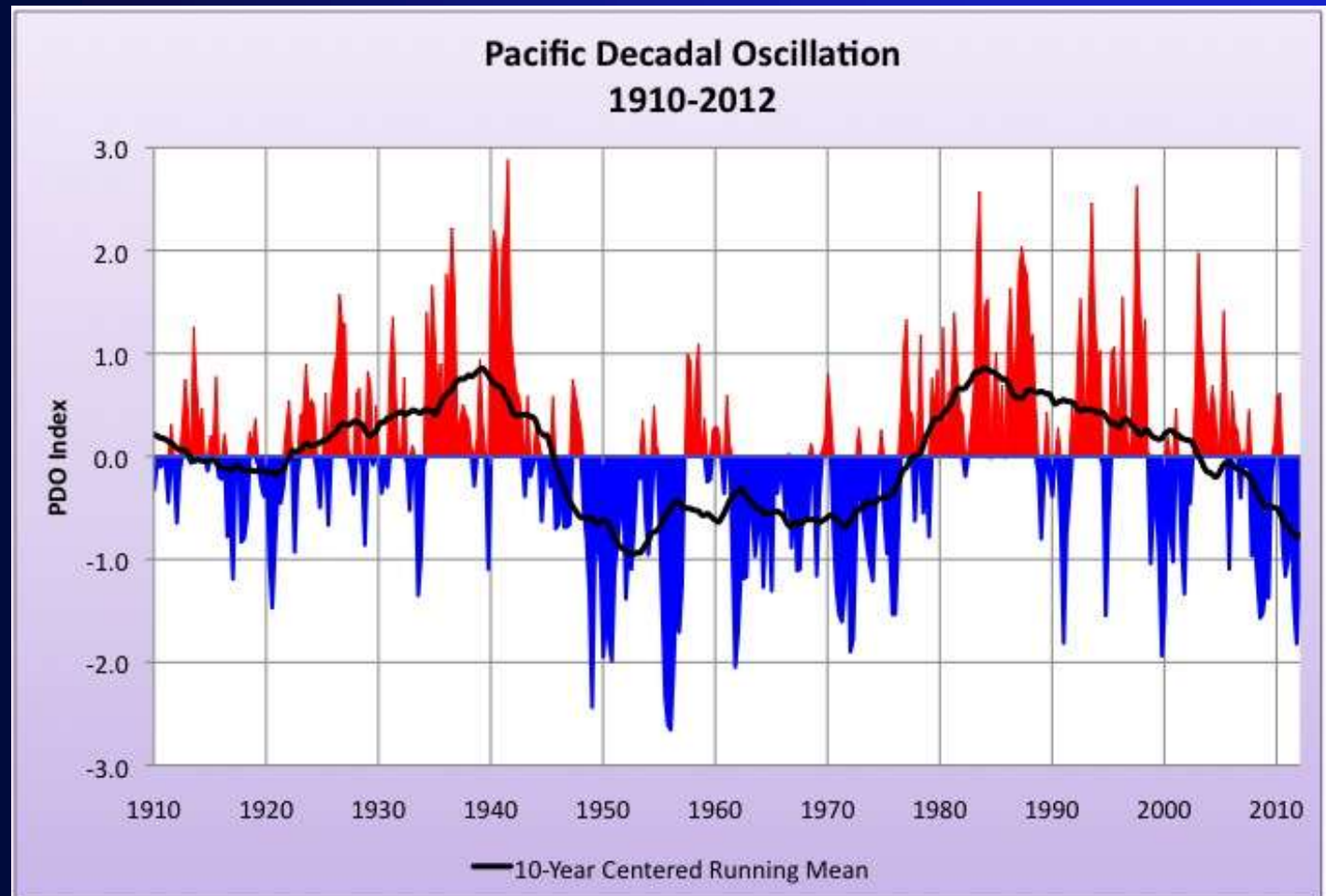
Pacific Decadal Oscillation



Warm for Alaska

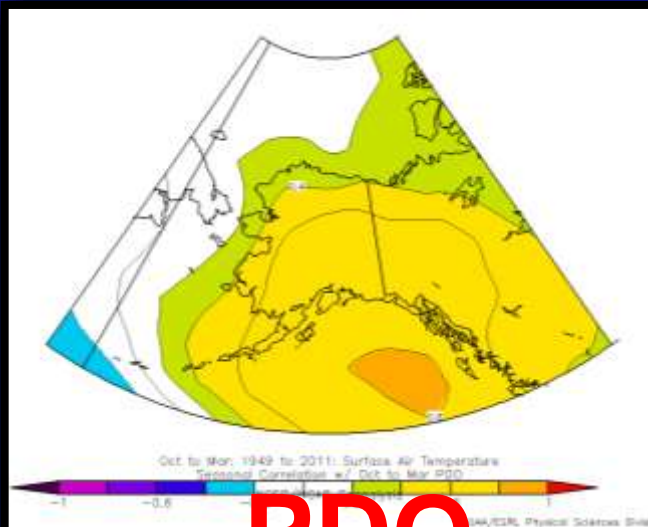
Cool for Alaska

Pacific Decadal Oscillation

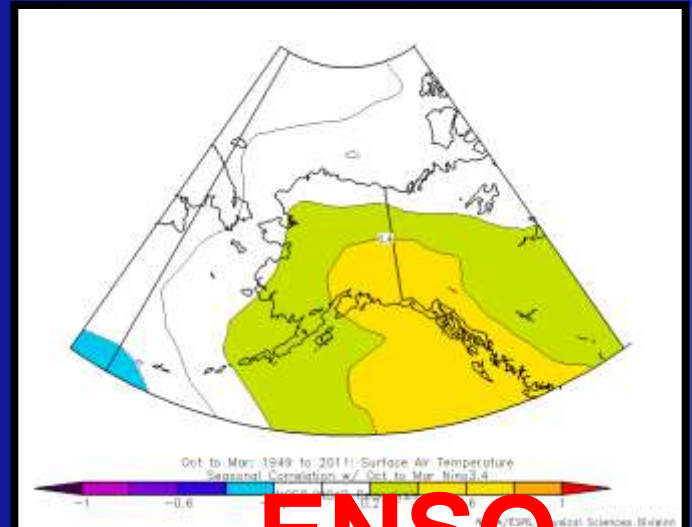
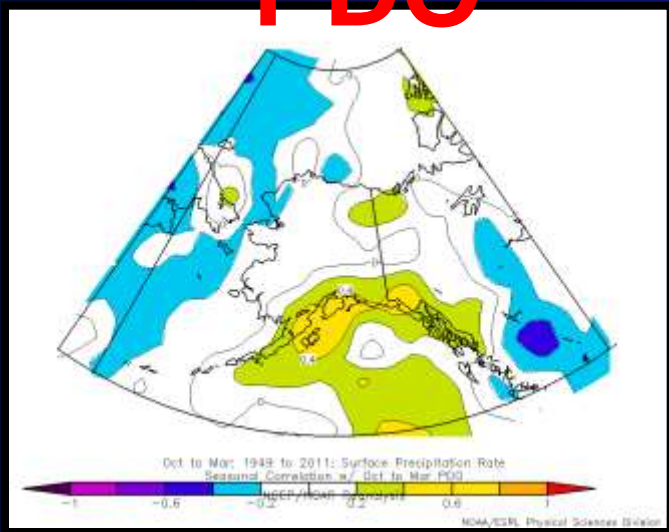


Data from U. Washington

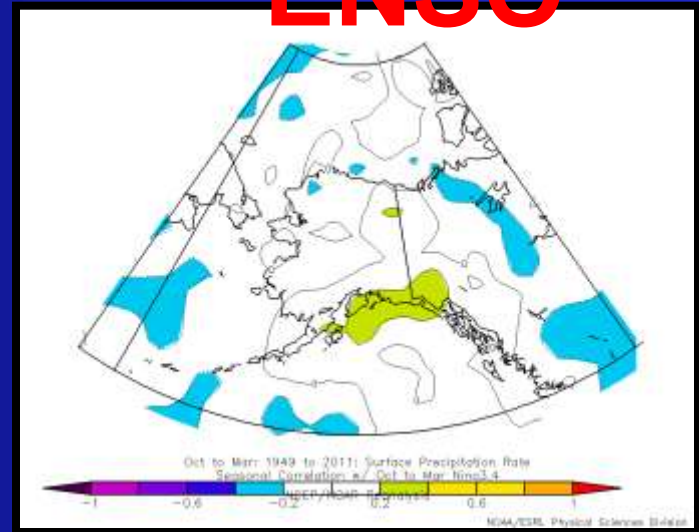
Cold Season Correlations



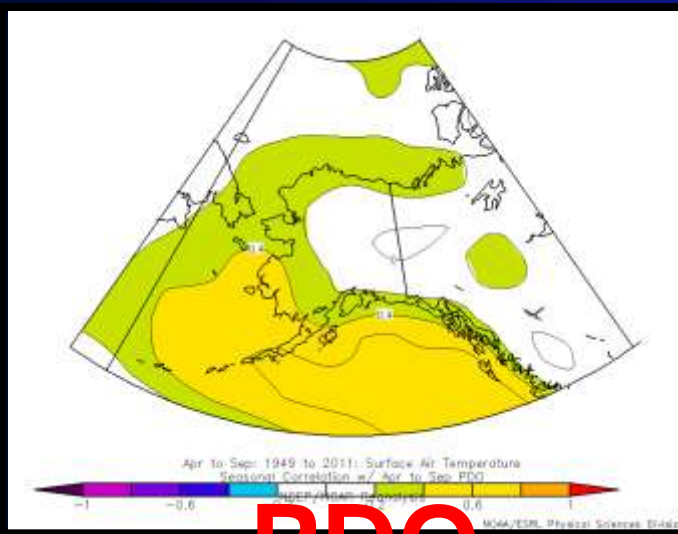
PDO



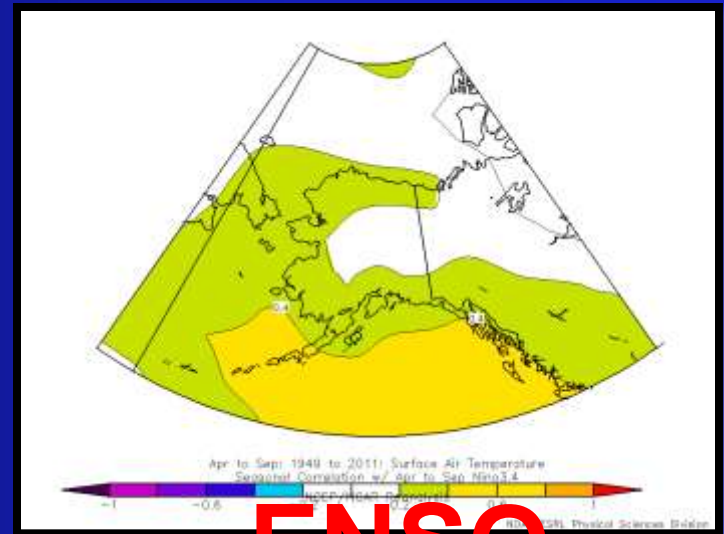
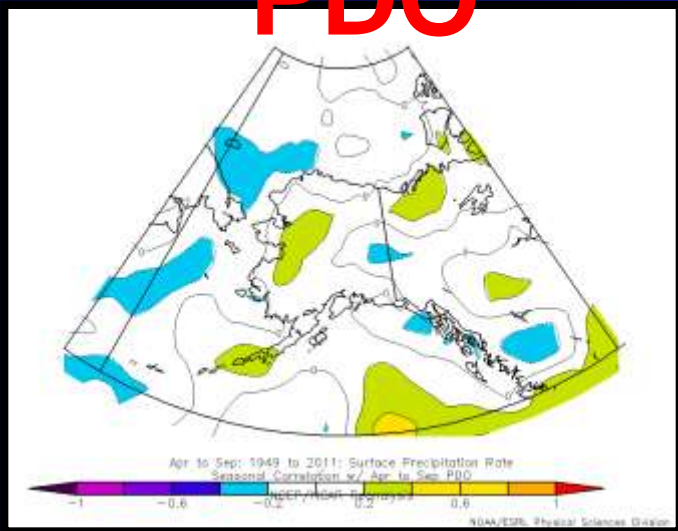
ENSO



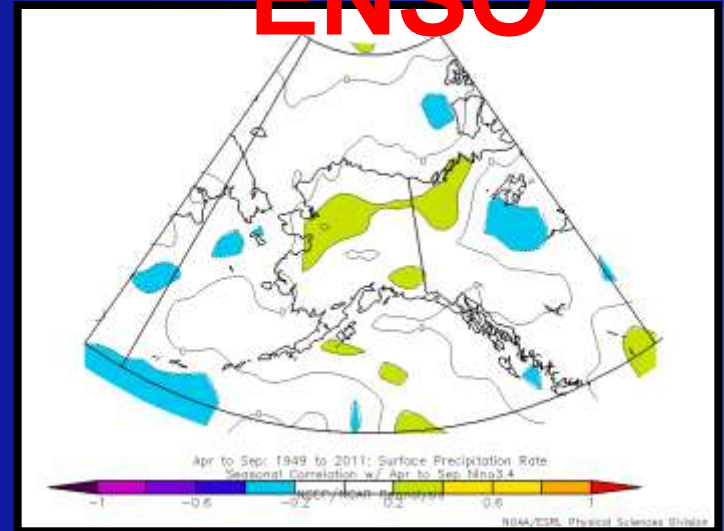
Warm Season Correlations



PDO



ENSO



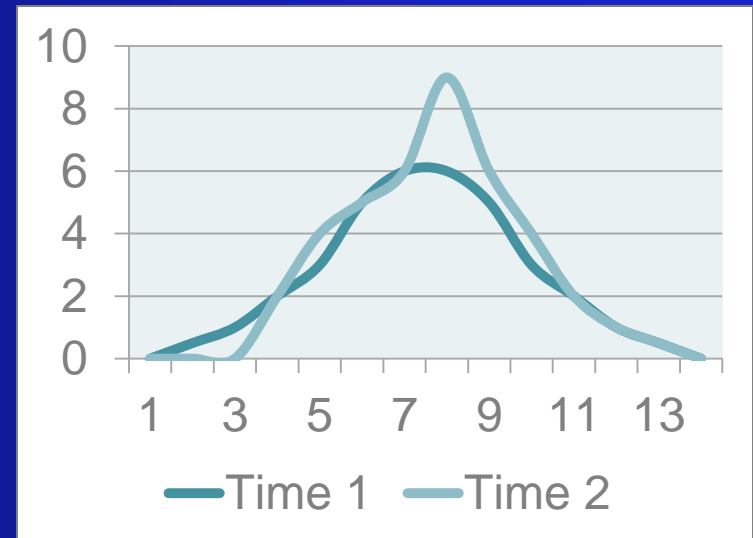
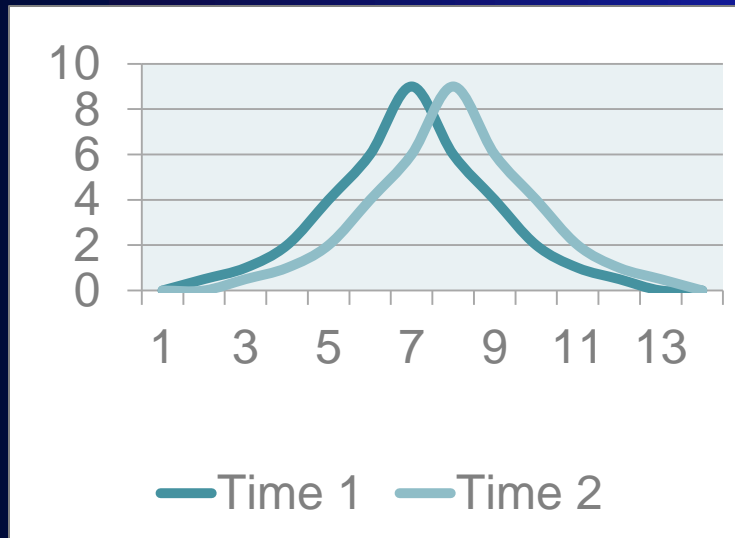
What Does Climate Change Mean?

- What does it mean to say that the average temperature will be warmer/colder?
- What does it mean to say that storms will be more/less frequent?



What Is Climate Change?

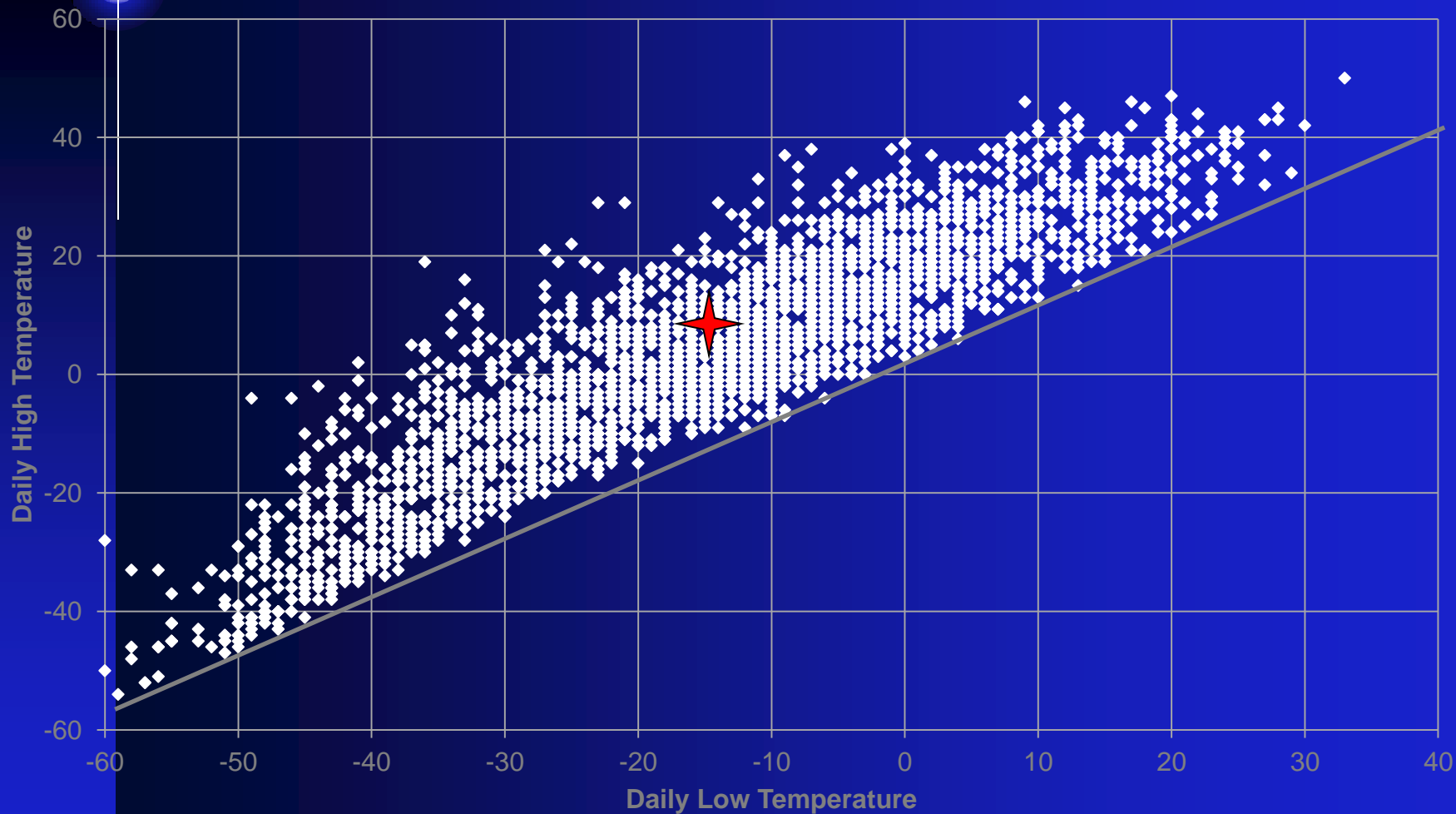
- Climate change = changes in the probability distribution function of some climatically relevant quantity over climatically relevant time scales



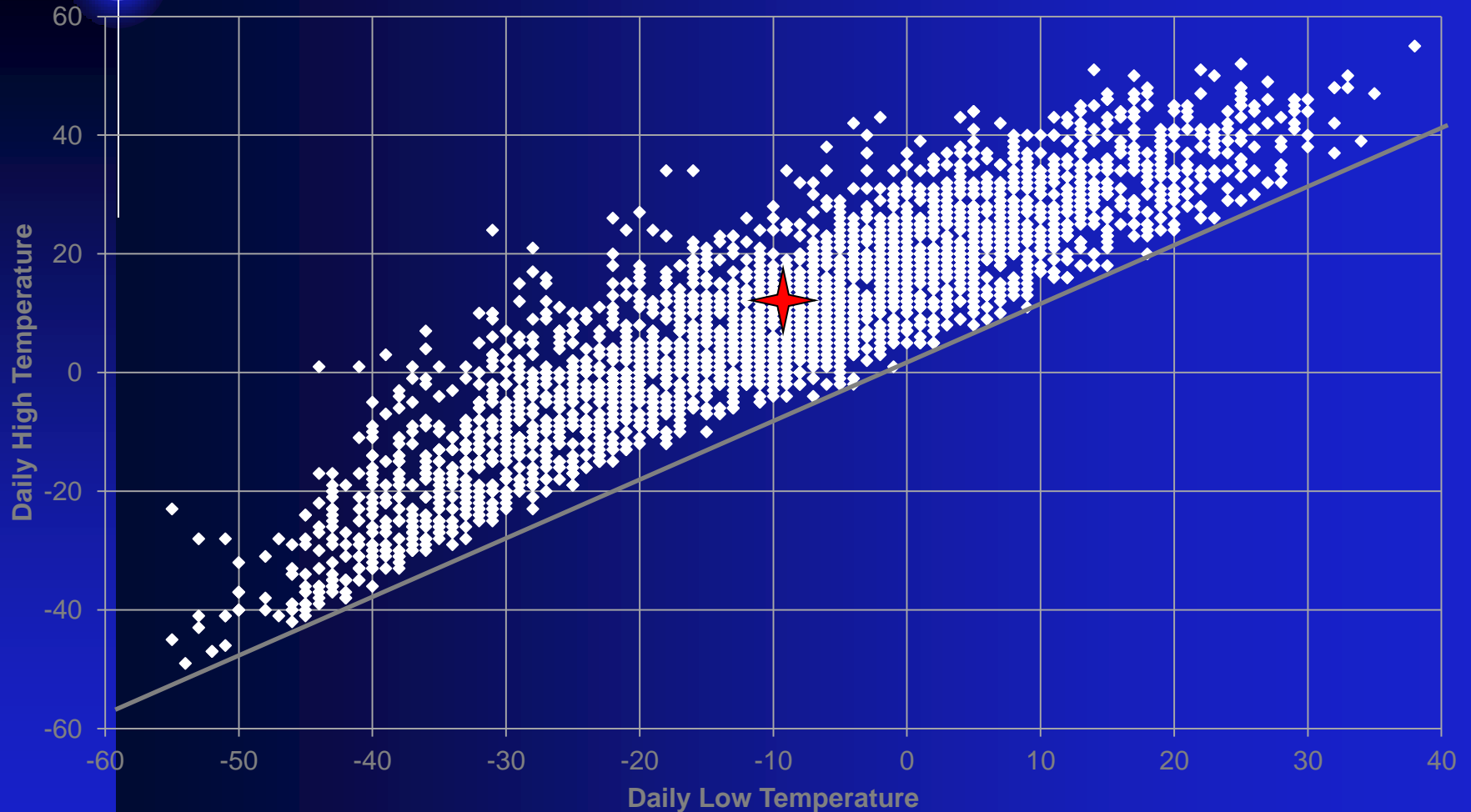
Fairbanks, Alaska

Daily Dec-Feb Temperatures

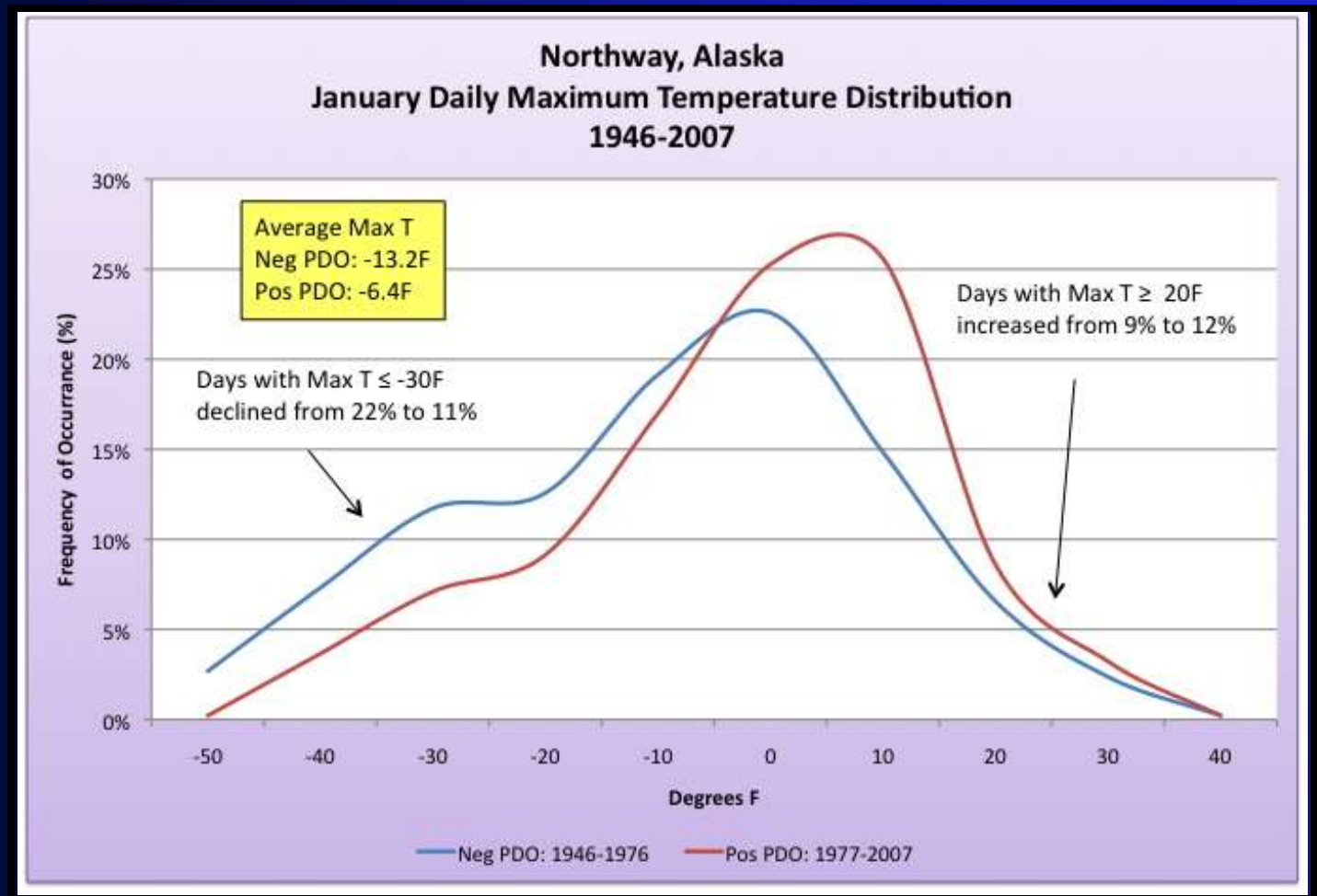
1971-2000



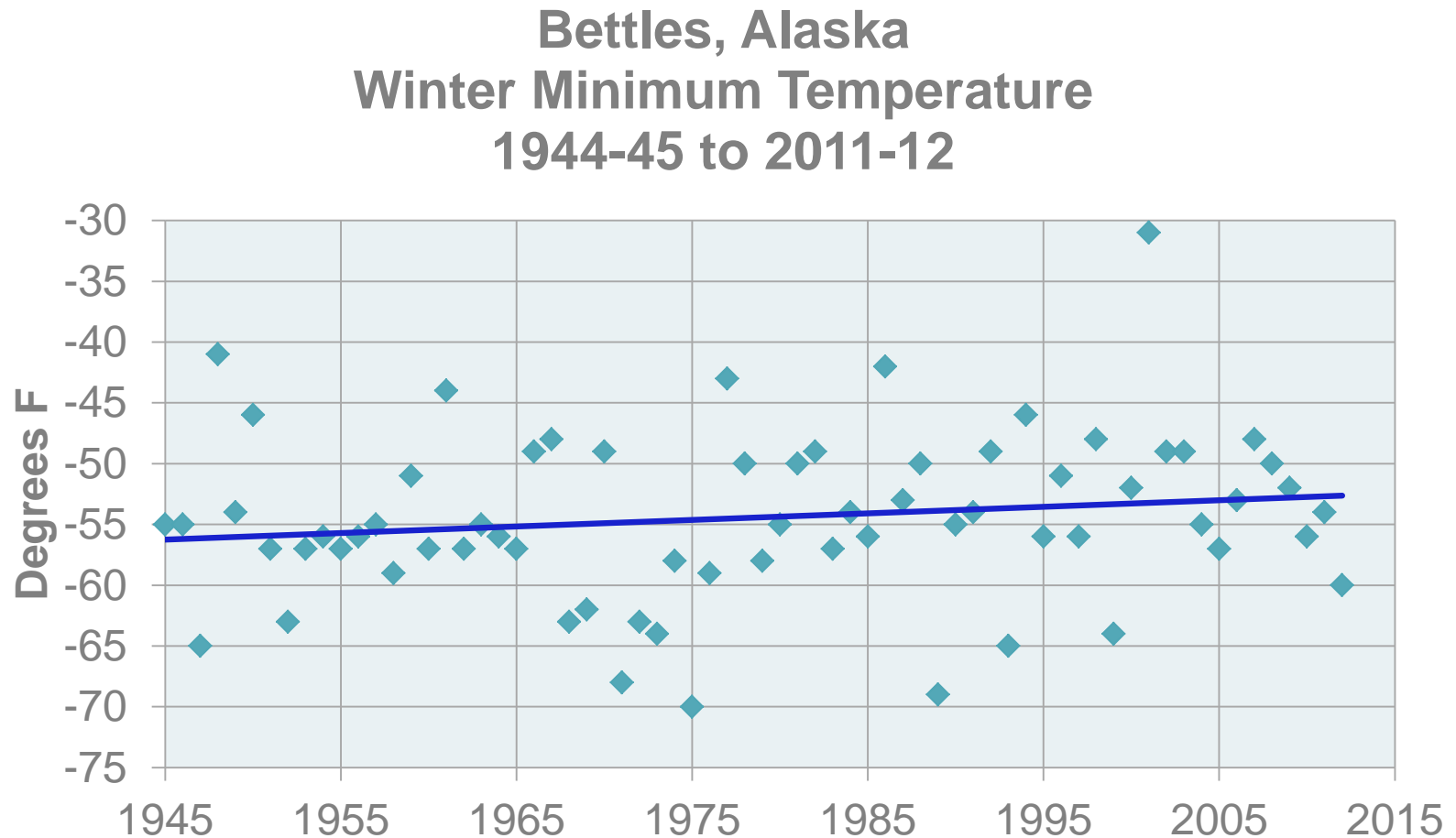
Fairbanks, Alaska
Daily Dec-Feb Temperatures
1971-2000 BUT warmed by 5° F



Actual Real-World Example



Don't be fooled by suspect analysis



Conclusions

- Few long instrumental climate record vicinity Central Alaska NPs
- Climate Variability=changes in statistics over seasonal to decadal time scales
- Climate Change=changes in statistics over decadal or longer time scales

Questions/Comments?



Thank You!